

Serial No. 09/731,945
Art Unit 1732

RECEIVED
CENTRAL FAX CENTER
OCT 05 2007

Amendments to the Claims

Claims 1-12, 16 and 17 and 28-33 were previously cancelled. Please amend claims 13, 19, 34, 38, 46, 49, 50, 53, 54 and 55 as follows:

1.-12. (Canceled)

13. (Currently Amended) A double vacuum chamber resin infusion method for a preform comprising:

~~assembling a preform;~~

locating ~~a~~ the preform on a mold;

sealingly bagging the preform to the mold with an inner bag forming a first vacuum chamber;

sealingly bagging the inner bag to the mold with an outer bag forming a second vacuum chamber;

evacuating the first vacuum chamber;

evacuating the second vacuum chamber with the pressure in the second vacuum chamber being equal to or greater than the pressure in the first vacuum chamber; and

infusing a resin into the preform using a vacuum-assisted resin transfer apparatus ~~while maintaining the pressure in the first and the second vacuum chambers.~~

14. (Currently Amended) A double vacuum chamber resin infusion method for a preform according to claim 13 further comprising substantially debulking the preform by evacuating at least the first vacuum chamber prior to infusing the resin.

15. (Previously presented) A double vacuum chamber resin infusion method for a preform according to claim 13 further comprising elevating the temperature of at least the first vacuum chamber and then evacuating at least the first vacuum chamber.

16. (Canceled)

Serial No. 09/731,945
Art Unit 1732

17. (Canceled)

18. (Previously presented) A double vacuum chamber resin infusion method for a preform according to claim 13 further comprising locating passive vacuum chambers within the first vacuum chamber.

19. (Currently Amended) A double vacuum chamber resin infusion method for a preform according to claim 13 further comprising assembling the preform by tackifying the preform with a tackifier solution prior to bagging.

20. (Previously presented) A double vacuum chamber resin infusion method for a preform according to claim 13 further comprising:
locating a flow control media between the inner bag and the preform; and
infusing the resin into the flow control media with the resin passing through the flow control media and then into the preform.

21. (Previously presented) A double vacuum chamber resin infusion method for a preform according to claim 20 wherein the flow control media includes fill fibers that act as weirs to the infusing resin.

22. (Previously presented) A double vacuum chamber resin infusion method for a preform according to claim 13 further comprising locating a breather between the inner bag and the outer bag.

23. (Previously presented) A double vacuum chamber resin infusion method for a preform according to claim 20 further comprising tilting the preform and the flow control media at an angle off horizontal and then infusing the resin into the flow control media with the resin passing through the flow control media and then into the preform.

Serial No. 09/731,945
Art Unit 1732

24. (Previously presented) A double vacuum chamber resin infusion method for a preform according to claim 23 wherein the tilted flow control media has a lowest point and infusing the resin into the flow control media at the lowest point.

25. (Previously presented) A double vacuum chamber resin infusion method for a preform according to claim 13 further comprising coupling at least one vacuum pump to the first vacuum chamber via at least one first vacuum tube and coupling at least one vacuum pump to the second vacuum chamber via at least one second vacuum tube.

26. (Currently Amended) A double vacuum chamber resin infusion method for a preform according to claim 25 further comprising throttling the at least one first vacuum tube while infusing a resin such that the inner bag is substantially prevented from relaxing behind a wave front of resin when resin is infused into the preform.

27. (Previously presented) A double vacuum chamber resin infusion method for a preform according to claim 13 wherein:

the first vacuum chamber comprising a first space bounded by and including the inner bag and the mold; and

the second vacuum chamber comprising a second space bounded by and including the inner bag, the mold, and the outer bag.

28.-33. (Canceled)

34. (Currently Amended) A double vacuum chamber resin infusion method for a preform comprising:

~~assembling a preform;~~

locating ~~a~~ the preform on a mold;

bagging the preform to the mold with an inner bag forming a first vacuum chamber;

bagging the inner bag to the mold with an outer bag forming a second vacuum chamber;

Serial No. 09/731,945
Art Unit 1732

evacuating the first vacuum chamber such that the first vacuum chamber collapses substantially against the preform;

evacuating the second vacuum chamber such that the second vacuum chamber collapses substantially against the first vacuum chamber; and

infusing a resin into the preform using a vacuum-assisted resin transfer apparatus.

35. (Currently Amended) A double vacuum chamber resin infusion method for a preform according to claim 34 further comprising substantially debulking the preform by evacuating at least the first vacuum chamber prior to infusing the resin.

36. (Previously presented) A double vacuum chamber resin infusion method for a preform according to claim 34 further comprising elevating the temperature of at least the first vacuum chamber and then evacuating at least the first vacuum chamber.

37. (Previously presented) A double vacuum chamber resin infusion method for a preform according to claim 34 further comprising locating passive vacuum chambers within the first vacuum chamber.

38. (Currently Amended) A double vacuum chamber resin infusion method for a preform according to claim 34 further comprising assembling the preform by tackifying the preform with a tackifier solution prior to bagging.

39. (Previously presented) A double vacuum chamber resin infusion method for a preform according to claim 34 further comprising:

locating a flow control media between the inner bag and the preform; and

infusing the resin into the flow control media with the resin passing through the flow control media and then into the preform.

Serial No. 09/731,945
Art Unit 1732

40. (Previously presented) A double vacuum chamber resin infusion method for a preform according to claim 39 wherein the flow control media includes fill fibers that act as weirs to the infusing resin.

41. (Previously presented) A double vacuum chamber resin infusion method for a preform according to claim 39 further comprising tilting the preform and the flow control media at an angle off horizontal and then infusing the resin into the flow control media with the resin passing through the flow control media and then into the preform.

42. (Previously presented) A double vacuum chamber resin infusion method for a preform according to claim 41 wherein the tilted flow control media has a lowest point and infusing the resin into the flow control media at the lowest point.

43. (Previously presented) A double vacuum chamber resin infusion method for a preform according to claim 34 further comprising coupling at least one vacuum pump to the first vacuum chamber via at least one first vacuum tube and coupling at least one vacuum pump to the second vacuum chamber via at least one second vacuum tube.

44. (Currently Amended) A double vacuum chamber resin infusion method for a preform according to claim 43 further comprising throttling the at least one first vacuum tube while infusing a resin such that the inner bag is substantially prevented from relaxing behind a wave front of resin when resin is infused into the preform.

45. (Previously presented) A double vacuum chamber resin infusion method for a preform according to claim 34 wherein:

the first vacuum chamber comprising a first space bounded by and including the inner bag and the mold; and

the second vacuum chamber comprising a second space bounded by and including the inner bag, the mold, and the outer bag.

Serial No. 09/731,945
Art Unit 1732

46. (Currently Amended) A method for infusing with resin a preform disposed on a mold, the method comprising:

locating the preform on a mold;

forming a redundant double-bag arrangement by:

disposing an inner bag over the perform;

sealing the inner bag to the mold to form an inner vacuum chamber defined by the inner bag and the mold;

disposing an outer bag over the inner bag; and

sealing the outer bag to the mold to form an outer vacuum chamber defined by the outer bag, the inner bag, and the mold;

evacuating the vacuum chambers such that the outer vacuum chamber has a pressure ~~approximately equal to or~~ greater than a pressure in the inner vacuum chamber such that the inner bag is substantially prevented from relaxing behind a wave front of resin when resin is infused into the perform; and

infusing resin into the preform while substantially maintaining the pressures in the vacuum chambers.

47. (Previously presented) The method of claim 46 wherein the evacuating step further comprises evacuating the vacuum chambers such that the bags provide a caul effect with respect to the perform.

48. (Previously presented) The method of claim 46 wherein the forming step further comprises forming the redundant double-bag arrangement such that if one of the vacuum chambers fails, the other vacuum chamber substantially maintains vacuum integrity.

49. (Currently Amended) The method of claim 46 wherein the evacuating step further comprises evacuating the vacuum chambers such that the outer bag collapses substantially against the inner bag and the inner bag collapses substantially against the preform.

Serial No. 09/731,945
Art Unit 1732

50. (Currently Amended) A method for infusing a preform with resin, the method comprising:

forming redundant vacuum chambers about the perform such that:

an inner vacuum chamber is received within an outer vacuum chamber; ~~and~~

debulking the preform substantially by evacuating the vacuum chambers such that

the outer vacuum chamber has a pressure greater than a pressure in the inner vacuum chamber;

if one of the vacuum chambers fails, the other vacuum chamber maintains the

preform substantially debulked by maintaining vacuum integrity; and

~~evacuating the vacuum chambers such that the outer vacuum chamber has a pressure approximately equal to or greater than a pressure in the inner vacuum chamber; and~~

infusing resin into the preform while substantially maintaining the pressures in the vacuum chambers.

51. (Previously presented) The method of claim 50 wherein the perform is disposed on a mold, the forming step further comprising forming the redundant vacuum chambers by:

sealing the inner bag to the mold to form the inner vacuum chamber defined by the inner bag and the mold;

disposing an outer bag over the inner bag; and

sealing the outer bag to the mold to form the outer vacuum chamber defined by the outer bag, the inner bag, and the mold.

52. (Previously presented) The method of claim 50 wherein the evacuating step further comprises evacuating the vacuum chambers such that the bags provide a caul effect with respect to the perform.

53. (Currently Amended) The method of claim 50 wherein the evacuating step further comprises evacuating the vacuum chambers such that the outer vacuum chamber collapses substantially against the inner vacuum chamber and such that the inner vacuum chamber collapses substantially against the preform..

Serial No. 09/731,945
Art Unit 1732

54. (Currently Amended) A method for infusing with resin a preform disposed on a mold, the method comprising:

locating the preform on a mold;

forming a redundant double-bag arrangement by:

disposing an inner bag over the perform;

sealing the inner bag to the mold to form an inner vacuum chamber defined by the inner bag and the mold;

disposing an outer bag over the inner bag; and

sealing the outer bag to the mold to form an outer vacuum chamber defined by the outer bag, the inner bag, and the mold;

evacuating the vacuum chambers such that the bags provide a caul effect with respect to the preform; and

infusing resin into the preform when the vacuum chambers are evacuated such that the inner bag is substantially prevented from relaxing behind a wave front of resin when resin is infused into the perform.

55. (Currently Amended) The method of claim 54 wherein the evacuating step further comprises evacuating the vacuum chambers such that the outer vacuum chamber has a pressure ~~approximately equal to or greater than~~ a pressure in the inner vacuum chamber.

56. (Previously presented) The method of claim 54 wherein the forming step further comprises forming the redundant double-bag arrangement such that if one of the vacuum chambers fails, the other vacuum chamber substantially maintains vacuum integrity.

57. (Previously presented) The method of claim 54 wherein the evacuating step further comprises evacuating the vacuum chambers such that the outer vacuum chamber collapses substantially against the inner vacuum chamber.